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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,187	02/19/2004	Ian M. McMackin	P116-58-03	4105

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EXAMINER	
NGUYEN, SANG H	
ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H·A

Office Action Summary	Application No.	Applicant(s)	
	10/782,187	MCMACKIN ET AL.	
	Examiner	Art Unit	
	Sang Nguyen	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/04; 04/05* .
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 10/12/04 and 04/12/05. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "**an imprint head defect**" the "**a support stack defect**", the "**a template defect**", and the "**a substrate defect**" in claims 5, 8-9, 12, 17, 20-21, and 26 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 8-9 are objected to because of the following informalities:

Claims 8-9 recite the limitation "a template defect" and "a head defect"" in claim 8, and the "a support stack defect" and a substrate defect" in claim 9. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 10, 16, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hongo et al (U.S. Patent No. 4,444,801).

Regarding claims 1-2, 10, 16, and 22; Hongo et al discloses a method for measuring characteristics of a film (19 of figure 1) disposed on a substrate is a photomask substrate(7 of figure 1), said method comprising:

identifying a plurality of processing regions (32a-32d of figure 3) on said film (30 of figure 3) of the photomask substrate (29 of figure 3);

measuring characteristics of a subset considered to a defect (8 of figure 1 or 31a-31d of figure 3) of said plurality of processing regions (32a-32d of figure 3), defining measured characteristics by a detector (24 of figure 1);

determining a variation of one of said measured characteristics (8 of figure 1 or 31a-31d of figure 3) by a control unit coupled to a recorder (28 of figure 1), wherein the variation is an anomaly or a defect (8 of figure 1) on the film (19 of figure 1); and

associating a cause said variations based upon a comparison (40, 41 of figure 4) of said one of said measured characteristics to measured characteristics associated with the remaining processing regions of said subset (col.6 lines 10-58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 6-7, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (U.S. Patent No. 4,444,801) in view of Hoki (U.S. Patent No. 5,774,574).

Regarding claim 3; Hongo et al teaches all of features of claimed invention except for the variation is an alignment error. However, Hoki teaches that it is known in

the art to provide he variation is an alignment error (col.1 lines 12-25). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with the variation is an alignment error as taught by Hoki for the purpose of accurate inspecting result by comparing the objective image as a whole with the standard pattern image.

Regarding claims 6-7 and 18-19; Hongo et al teaches all of features of claimed invention except for obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold. However, Hoki teaches that it is known in the art to provide a pattern defect detection apparatus comprising obtaining a mean value considered to be a comparison inspection part (100 of figure 1) coupled to out put part (34 of figure 1) and a standard deviation considered to be a image memory (32 of figure 1) from said mean value (100 of figure 1) for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold (col.3 line 15 to col.4 line 45). 1-9. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a

predetermined threshold as taught by Hoki for the purpose of improving accuracy of detecting a pattern defect during comparison inspections.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (U.S. Patent No. 4,444,801) in view of Willson et al (U.S. Patent No. 6,334,960).

Regarding claim 4; Hongo et al teaches all of features of claimed invention except for the variation is a critical dimension. However, Rangarajan et al teaches that it is known in the art to provide the variation is a critical dimension (col.9 lines 18-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with the variation is an alignment error as taught by Rangarajan et al for the purpose of measuring accurate several patterned layers with high purity and low particle chemicals.

Claims 5, 8-9, 17, and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (U.S. Patent No. 4,444,801) in view of B. J. Choi et al (Design of orientation stages for step and flash imprint lithography; pages 192-199).

Regarding claims 5, 8-9, 17, and 20-21; Hongo et al teaches all of features of claimed invention except for the cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect, and a substrate defect.

However, B. J. Choi et al teaches that it is known in the art to provide he cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect, and a substrate defect (figures 1-5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with an imprint head defect, a support stack defect, a template defect, and a substrate defect as taught by B. J. Choi et al for the purpose of high–resolution imprint lithography machines in order to eliminate the particle contamination.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (U.S. Patent No. 4,444,801) in view of Hoki (U.S. Patent No. 5,774,574).

Regarding claim 11; Hongo et al discloses a method for measuring characteristics of a film disposed on a substrate, said method comprising:

identifying a plurality of processing regions (32a-32d of figure 3) on said film (30 of figure 3) of the photomask substrate (29 of figure 3);

measuring characteristics of a subset considered to a defect (8 of figure 1 or 31a-31d of figure 3) of said plurality of processing regions (32a-32d of figure 3), defining measured characteristics by a detector (24 of figure 1);

determining a variation of one of said measured characteristics (8 of figure 1 or 31a-31d of figure 3) by a control unit coupled to a recorder (28 of figure 1), wherein the variation is an anomaly or a defect (8 of figure 1) on the film (19 of figure 1); and

associating a cause said variations based upon a comparison (40, 41 of figure 4) of said one of said measured characteristics to measured characteristics associated with the remaining processing regions of said subset (col.6 lines 10-58).

Hongo et al teaches all of features of claimed invention except for obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold. However, Hoki teaches that it is known in the art to provide a pattern defect detection apparatus comprising obtaining a mean value considered to be a comparison inspection part (100 of figure 1) coupled to out put part (34 of figure 1) and a standard deviation considered to be a image memory (32 of figure 1) from said mean value (100 of figure 1) for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold (col.3 line 15 to col.4 line 45). 1-9.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold as taught by Hoki for the purpose of improving accuracy of detecting a pattern defect during comparison inspections.

Claims 12 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al in view of Koki as applied to claim 11 above, and further in view of B. J. Choi et al (Design of orientation stages for step and flash imprint lithography; pages 192-199).

Regarding claims 12 and 14-15; Hongo et al teaches all of features of claimed invention except for the cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect, and a substrate defect. However, B. J. Choi et al teaches that it is known in the art to provide he cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect, and a substrate defect (figures 1-5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with an imprint head defect, a support stack defect, a template defect, and a substrate defect as taught by B. J. Choi et al for the purpose of high–resolution imprint lithography machines in order to eliminate the particle contamination.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al in view of Koki as applied to claim 11 above, and further in view of Rangarajan et al (U.S. Patent No. 6,771,374).

Regarding claim 13; Hoki teaches that it is known in the art to provide the variation is an alignment error (col.1 lines 12-25) except for a critical dimension. However, Rangarajan et al teaches that it is known in the art to provide the variation is a

critical dimension (col.9 lines 18-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al in view of Hoki with the variation is an alignment error as taught by Rangarajan et al for the purpose of measuring accurate several patterned layers with high purity and low particle chemicals.

Claims 23-25 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al (U.S. Patent No. 4,444,801) in view of Willson et al (U.S. Patent No. 6,334,960).

Regarding claims 23-24; Hongo et al discloses a system and method for measuring characteristics of a film disposed on a substrate, said system comprising:

substrate support stack (20 of figure 1);

substrate (7 of figure 1) disposed on said substrate support stack (20 of figure 1);

a sensing system (a laser [1 of figure 1] and light source [13 of figure 1], and a detector 24 of figure 1]); and

means considered to be a control unit (26 of figure 1) coupled to a recorder (28 of figure 1 preferably to figure 4) for identifying a plurality of processing regions (32a-32d of figure 3) of the film (19 of figure 1 or 30 of figure 3) on the substrate (7 of figure 1 or 29 of figure 3) by the exposure laser (1 of figure 1) , a subset (8 of figure 1 or 31a-31d of figure 3) of which has characteristics associated the plurality of the processing regions (32a-32d of figure 3) therewith, and ascertaining a cause of an anomaly considered to be a defect (31a-31d of figure 3) in characteristics of one of said plurality

of processing regions (32a-32d of figure 3)by comparing of the characteristics of said one of said plurality of processing regions (32a-32d of figure 3) with characteristics associated with the remaining processing regions of said subset (31a-31d of figures 3-4). See figures 1-8.

Hongo et al discloses all of features of claimed invention except for a template disposed on an imprint head. However, Willson et al teaches that it is known in the art to provide flash imprint lithography comprising a template figures 1A-1D) disposed on an imprint head considered to be a mold device (40 of figure 1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a system and method for measuring characteristics of a film disposed on a substrate of Hongo et al with a template disposed on an imprint head as taught by Willson et al for the purpose of forming accuracy image patterns in a structure by mold pattern.

Regarding claim 25; Hongo et al teaches of means (26, 28 of figure 1) for identifying further includes a processor (43, 44 of figure 4) and a memory device (34 of figure 4) storing code to be operated on said processor (43, 44 of figure 4), with said code including a first subroutine to control said sensing device (24 of figure 1) to impinge optical radiation on the plurality of processing region of said subset and detect optical radiation reflected therefrom. See figures 1-4.

Regarding claims 27-28; Hongo et al teaches all of features of claimed invention except for obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one

of said measured characteristics by comparing said standard deviation with a predetermined threshold. However, Hoki teaches that it is known in the art to provide a pattern defect detection apparatus comprising obtaining a mean value considered to be a comparison inspection part (100 of figure 1) coupled to out put part (34 of figure 1) and a standard deviation considered to be a image memory (32 of figure 1) from said mean value (100 of figure 1) for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold (col.3 line 15 to col.4 line 45). 1-9. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with obtaining a mean value and a standard deviation from said mean value for one of said measured characteristics and determining a variation of said one of said measured characteristics by comparing said standard deviation with a predetermined threshold as taught by Hoki for the purpose of improving accuracy of detecting a pattern defect during comparison inspections.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hongo et al in view of Koki as applied to claim 23 above, and further in view of B. J. Choi et al (Design of orientation stages for step and flash imprint lithography; pages 192-199).

Regarding claim 26; Hongo et al teaches all of features of claimed invention except for the cause is selected from a set of causes as an imprint head defect, a

support stack defect, a template defect, and a substrate defect. However, B. J. Choi et al teaches that it is known in the art to provide he cause is selected from a set of causes as an imprint head defect, a support stack defect, a template defect, and a substrate defect (figures 1-5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine a method for measuring characteristics of a film disposed on a substrate of Hongo et al with an imprint head defect, a support stack defect, a template defect, and a substrate defect as taught by B. J. Choi et al for the purpose of high–resolution imprint lithography machines in order to eliminate the particle contamination.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Tada et al (6746319) discloses measuring apparatus; Doi et al (5331407) discloses method and apparatus for detecting a circuit pattern; or Terasawa et al (5235400) discloses method and apparatus for detecting defect on a photomask.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SN

Sang Nguyen/SN

July 18, 2005

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